LAYLA®24

LAYLA® LapTop

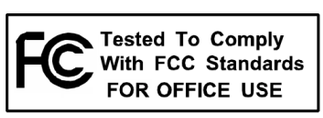
MONA™

MONA™ LapTop

GINA®24

MIA™

Owner's Manual Version 3.0 for Macintosh



Designed and Manufactured in the U.S. by Echo Corporation

Important Safety Instructions

1. Read Instructions - Be sure to read all of the safety and operating instructions before operating this product.

2. Retain Instructions - The safety instructions and owner's manual should be retained for future reference.

3. Heed Warnings - All warnings on your Echo hardware and in the Owner's Manual should be followed.

4. Follow Instructions - All operating and use instructions should be followed.

5. Moisture - Water and moisture are detrimental to the continued good health of your Echo hardware. Do not install or operate your Echo hardware near sources of water or moisture such as sinks, damp basements, leaky roofs, etc.

6. Heat – Your Echo hardware should be situated away from sources of heat such as heaters or radiators.

7. Power Sources - This unit should be operated only from the type of power source indicated in this documentation or on your Echo hardware. If you are unsure about the type of power at your location, contact your local power company.

8. Grounding - Precautions should be taken so that the grounding capabilities of the unit are not undermined. This equipment is provided with a cord having an equipment grounding conductor and grounding plug. This plug must be plugged into an outlet that is properly installed and grounded in accordance with all local rules and ordinances. Do not modify the plug provided with the equipment. If the plug will not fit into your outlet, have a proper outlet installed by a qualified electrician.

9. Power Cord Protection (not Mia) - Power supply cords should be routed so that they are unlikely to be walked on or pinched by items placed upon or against them. Pay particular attention to protecting the plugs, outlets, and the point at which the cord exits your Echo hardware.

10. Servicing - Do not attempt to service this unit yourself, as opening the case will expose you to hazardous voltage or other dangers. All servicing should be referred to qualified service personnel.

11. Damage Requiring Service - Unplug this unit and refer it to a qualified service technician when any of the following occur:

a) Objects have fallen or liquid has spilled into the unit
b) The product has been exposed to rain or water
c) The product does not operate normally or when a marked change in performance is noticed
d) The product has been dropped or damaged in any way

Sending in your registration card – or registering online at **http://www.echoaudio.com/register.html** - allows us to register key information so that we may handle problems faster and inform you of advance information on upgrades and other news. Thanks in advance for filling out your registration card and sending it to us. We hope you enjoy your Echo product.

Limited Warranty

Echo Digital Audio Corporation warrants this product, when purchased at an Authorized Echo Dealer in the United States of America, to be free of defects in materials and manufacturing workmanship for a period of one year from the date of original purchase. During the warranty period Echo shall, at its option, either repair or replace any product that proves to be defective upon inspection by Echo. Final determination of warranty coverage lies solely with Echo. Echo reserves the right to update any unit returned for repair, and reserves the right to change or improve the design of the product at any time without notice.

This is your sole warranty. Echo does not authorize any third party, including any dealer or sales representative, to assume any liability on behalf of Echo or to make any warranty for Echo.

Service and repairs of Echo products are to be performed only at the factory (see below) unless otherwise authorized in advance by the Echo Service Department. Unauthorized service, repair or modification will void this warranty.

To obtain factory service:

Contact Echo Digital Audio Corporation at (805) 684-4593, 9AM to 5PM Monday through Friday (Pacific Time). If necessary, you will be given a return authorization number. Products returned without an RA number will be refused. Echo may, at its option, require proof of the original date of purchase in the form of a dated copy of the original authorized dealer's invoice or sales receipt. Pack the product in its original shipping carton and attach a description of the problem along with your name and a phone number where Echo can contact you if necessary. Ship the product insured and freight prepaid to:

Echo Digital Audio Corporation
6460 Via Real
Carpinteria, CA 93013

DISCLAIMER AND LIMITATION OF WARRANTY

Echo makes no other warranties, express, implied, or otherwise, regarding Echo products, and specifically disclaims any warranty for merchantability or fitness for a particular purpose. The exclusion of implied warranties is not permitted in some states and the exclusions specified herein may not apply to you. This warranty provides you with specific legal rights. There may be other rights that you have which vary from state to state.

In no event will Echo be liable for any lost profits, or for any consequential, direct or indirect damages, however caused and on any theory of liability, arising from this warranty and sale.

©2000 by Echo Digital Audio Corporation
6460 Via Real
Carpinteria, CA 93013

Echo®, Layla®24, Layla *LapTop*®, Mona™, Mona *LapTop*™, Gina®24, and Mia™ are trademarks of Echo Digital Audio Corporation.

ADAT® is a registered trademark of Alesis Corporation.

Windows®, Windows 98®, Windows Me®, Windows XP®, and Windows 2000® are registered trademarks of Microsoft, Inc.

INTRODUCTION **5**
What You Should Have Received in the Box 5
CHECKING OUT YOUR MAC **7**
SOFTWARE INSTALLATION **8**
HARDWARE INSTALLATION **10**
Installing the PCI Card for Desktop Computers 10
Installing the CardBus Adapter for Laptop Computers 12
Connecting to Layla24's Rack-mount Audio Interface 13
Connecting to Mona's Rack-mount Audio Interface 17
Connecting to Mia 26
ASIO Driver Installation & Configuration 27
OMS Setup (Layla24 Only) 28
INSTALL CUBASIS **32**
THE CONSOLE – GINA24, LAYLA24, AND MONA **33**
Running the console 33
The console window 33
Menus 37
Shortcuts 37
THE CONSOLE - MIA **38**
Running the console 38
The console window 38
Menus 42
Shortcuts 42
SYNCHRONIZING MULTIPLE DEVICES **43**
ASIO Direct Monitoring 46
ASIO CONTROL PANEL **48**
CONTACTING CUSTOMER SERVICE **50**
CONTACTING STEINBERG CUSTOMER SERVICE **50**
APPENDIX A: GENERAL TROUBLESHOOTING GUIDE **51**
APPENDIX B: ASIO AUDIO SOFTWARE FAQ **55**
ASIO Software Compatibility List – 11/12/2001 55
Echo24 ASIO Driver and ASIO 2.0 55
APPENDIX C: INTRODUCTION TO DIGITAL RECORDING **56**
APPENDIX D: SPECIFICATIONS **63**

Introduction

Thank you for choosing Echo Digital Audio. We think you'll find your Echo product to be an extremely flexible, high-performance tool for your computer-based hard disk recording system.

What You Should Have Received in the Box

When you opened the box, you should have found the following:

- A PCI card wrapped in an anti-static cover **OR** a CardBus Adapter
- An audio interface box (Layla24, Mona, and Gina24 only)
- Four adhesive backed rubber feet (Layla24, Mona, and Gina24 only)
- Four mounting screws with collars (Layla24 and Mona only)
- An interface cable (Layla24, Mona, and Gina24 only)

  Please note*: The cable included with the Gina24 system is a shielded audio cable that has been custom manufactured to exacting standards. Use of any other cable, such as a computer printer cable, will substantially reduce the system's overall audio quality.*

- A power cable (Layla24 and Mona only)
- An Esync cable (Gina24)
- A CD-ROM containing:
  - Windows 98/Me/2000/XP Drivers
  - Macintosh Drivers
  - .PDF Users Guide
  - Steinberg's Cubasis VST multitrack recording and editing software, Windows and Macintosh versions.
  - Demo versions of digital audio recording, editing, and processing software from a variety of manufacturers
- Quick Start Guide

System Requirements

In order to use Layla24, Mona, Gina24 or Mia PCI you'll need the following:

An Apple brand Macintosh computer with:

- PCI architecture expansion slots (PCI version 2.1)
- A 604 or higher processor (G3 or G4 highly recommended)
- A minimum 128Mb RAM (more highly recommended)
- OS 8.6 or 9.x
- A fast, high-capacity IDE, SCSI or firewire hard disk drive.
- A audio software program that supports ASIO.
- Peripheral audio equipment, such as a mixer, microphones, studio monitors, musical instruments, etc.

Note: Echo will not be able to supply technical support for any non-Apple brand Macintosh clone computers. In addition, your Echo hardware may not work properly if you have a processor upgrade card installed.

In order to use Layla24 *LapTop* or Mona *LapTop* you'll need the following:

- An Apple Macintosh laptop G3 or G4 computer
- MacOS 8.6 or 9.x
- A minimum 128Mb RAM (more highly recommended)
- A fast, high-capacity IDE, SCSI or firewire hard disk drive.
- An audio software program that supports ASIO.
- Peripheral audio equipment, such as a mixer, microphones, studio monitors, musical instruments, etc.

Checking out your Mac

Before you install anything, you should double-check that your Mac is compatible with your new hardware.

1. **Do you have enough memory?** With your mouse select "About This Computer**"** from the "Apple" menu. Look at the amount of "Built-in Memory." You will need at least 128MB to use your Echo hardware properly. We strongly recommend having at least 256 MB.

2. **Is your processor compatible?** If you have a G3 or G4 then you can skip to step three. If you have an older Macintosh, select "Apple System Profiler**"** from the "Apple" menu. Under the "System Profile**"** tab, look at the section entitled "Hardware overview" and see what kind of processor you have. If it's a PowerPC 604 or higher, then you can use your Echo hardware.

3. **Does your desktop machine have an open PCI slot?** Make sure you have an open PCI slot in your Mac. If you don't know if you have one offhand, you will have to open up the Mac and look. Make sure you shut down the Mac and unplug the power cable before you open it. If you see an open PCI slot, then you're OK.

   Note: your Echo hardware may not work properly if you have a processor upgrade card installed.

If everything looks good, it's time to move on to the next phase of installation.

Software Installation

The first step is to install the software needed to support your Echo hardware.

1. **Power up.** Power up your Macintosh.

2. **Start the Installer.** Insert the Installation CD into your CD-ROM drive. Double click the icon called **Install Echo24**. Click the **Continue** button.

3. **Install the software.** Now you will be able to choose where the Echo24 Console software is installed. The default setting will create a folder called “Echo” on your main hard drive. When you are ready, click the **Install** button. The installer will now create the folder where you told it to and place the Console, the ASIO driver, and this manual inside it.

4. **Installation completed.** You will now see a message telling you that the installation was successful. Go ahead and click the **Quit** button. If you do not see this message, then please turn to **Appendix A: General Troubleshooting Guide** in the back of this manual for help.

Install Echo24 Card 1.0.0
Read Me...
Click the “Install” button to install
• Easy Install
Installation was successful. If you are finished, click Quit to leave the Installer. If you wish to perform additional installations, click Continue.
Continue
Quit
Install Location
Select Folder
on the disk “Macintosh HD”
Quit
Install

Now that you have finished installing the software, turn off your Mac so you can install the hardware.

Hardware Installation

The following steps will guide you through installing your Echo hardware.

Installing the PCI Card for Desktop Computers

Once you have checked your system requirements, verified that there are no problems with your system, and installed your ASIO-based software, it is time to install the Echo hardware into your computer. Please refer to the section in your Macintosh manual for installing a PCI card.

IMPORTANT - Unplug your computer and detach all peripherals before proceeding with the following steps.

1. **Remove your computer's cover.** This operation differs from computer to computer. Refer to your computer's manual for a further explanation of this step if necessary.

2. **Select the slot** into which you will install the Layla24 card. You may use any of the available PCI slots in your computer for Layla24. Remove the bracket covering the expansion slot where you would like to install Layla24. If there was a screw for the bracket, put it in a safe place, as you will need it later to complete the installation.

3. Insure that you have **fully discharged all static electricity** from your body before handling the card. This can be done through the use of a grounding strap or, more simply, by touching your bare hand to the metal casing of the computer's power supply. (For this latter method to work, the computer must be plugged in, though not turned on.) After you've discharged your static, unplug the computer before proceeding to the next step.

4. **Remove the card** from its protective anti-static bag. Handle the card carefully by its edges, and **insert it into the selected expansion slot.** Insure that the card's edge connector (the protruding edge with the gold leads) is seated firmly into the slot. Centering the card over the slot and using a gentle rocking motion while pushing downward into the slot generally works well. Be careful not to force the card into the slot, or bend or twist it while it is being inserted, as this could result in the card being damaged.

5. Now use the screw that you removed earlier, from the protective back plate, to **attach the metal bracket** on the card to the computer's rear panel. *On some older Macs, the locking mechanisms used to hold down the PCI cards cause difficulties properly seating the cards.* We recommend checking the card and making sure it is well seated and liable to stay that way. If the card is loose or being pushed around by the locking mechanism, we recommend loosening the

hex screws that hold the back-plate of the card to the Mac. The back-plate is the thin piece of metal connected to the Layla24 card that sits against the case of your computer. Another option, if that piece needs a little more play, is to gently bend it back. Some users have broken the plastic that comes with their Mac to solve this problem. However, due to Mac warranty issues, we are not able to recommend this approach.

6. OPTIONAL: *(If you have Mia, skip this step.)* Esync cables come with Gina24, and can be used to daisy chain several 24-bit Echo cards together. Esync is a proprietary form of super clock that allows you to sync together multiple 24-bit Echo products. Simply attach the Esync cable to the two-prong "Esync Out" connector on the Layla24/Mona/Gina24 PCI card, and attach the other end to the "Esync In" connector on your Gina24 PCI card.

7. **Replace the computer's cover,** and secure it. Reattach its power supply cord and reconnect any peripherals that you may have removed prior to beginning the installation.

8. *(If you have Mia, skip this step.)* Locate the audio interface box (Layla24, Mona, and Gina24), the interface cable, and the power cable. **Securely mount the interface** into your equipment rack (Layla24 and Mona). If you will not be mounting the box in a rack, remove the backing from the four rubber feet and place one in each bottom corner of the interface unit. Then be sure to locate the rack-mount box in a secure location.

   Plug one end of the cable into the connector on the Echo PCI card that now protrudes through the back panel of your computer, and secure the cable using the built-in screws located on both sides of the connector. Attach the other end of the cable to the rear of the interface and fasten the cable securely with the screws. Plug the power cable firmly into the interface and a power socket, but do not turn on the interface at this time (Layla24 and Mona).

Caution: Never connect the rack-mount interface to the computer while either the interface or your computer is turned on.

9. You can now **attach external audio devices** to the connectors. Information on attaching external devices to your particular interface may be found in the following sections.

10. Layla24 and Mona only – **Turn on** your Layla24 or Mona audio interface box.

11. **Turn on** your Mac**.**

Installing the CardBus Adapter for Laptop Computers

1. Locate the rack-mount interface, the 9-pin interface cable, and the power cable. **Securely mount the interface** into your equipment rack. If you will not be mounting the box in a rack, remove the backing from the four rubber feet and place one in each bottom corner of the interface unit. Then be sure to locate the rack-mount box in a secure location.

2. **Connect the cable**. Before installing the card into the computer, connect the cable between the card and the rack-mount chassis. Make sure the cable is fully inserted into the card and that it "clicks" into place. You may have to wiggle it a bit for this to happen.

3. **Insert the *LapTop* adapter** into your computer**.** Make sure the computer is turned off. To install the card, insert it into any available CardBus slot. Next, turn on the audio interface box.

4. You can now **attach external audio devices** to the connectors. Information on attaching external devices to your particular interface may be found in the following sections.

5. **Turn on** your audio interface box.

6. **Turn on** your Mac.

When the desktop appears, there should be a "CardBus" icon on the desktop labeled "Layla24" or "Mona". This shows the card is recognized and that your Layla24 or Mona is ready to use.

While it is possible to "hot-dock" the card and insert it with the laptop powered up, it is recommended that the card only be inserted or removed with the power off. *If you have to remove the card with the power on, you **must** disable it first.* To do this, drag the CardBus icon into the trashcan. Once the icon is no longer visible, you may remove the card. Failure to disable the card before removing it could potentially damage the card or the computer.

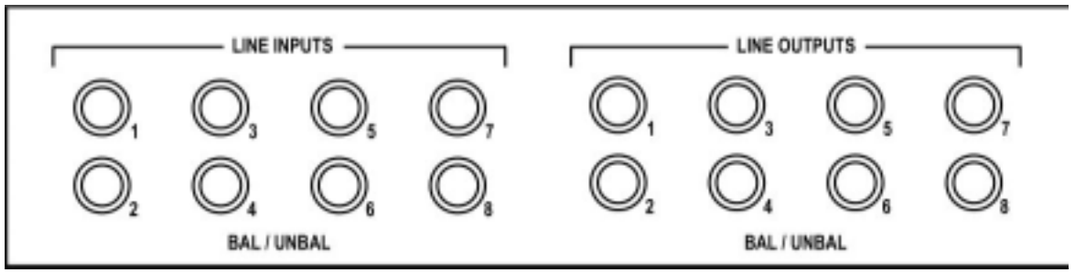
Note: There is a known incompatibility with the LapTop adapter and the older "Lombard" Powerbooks (G3, 300-400MHz) from Apple. Unfortunately, this is a problem that cannot be resolved. The adapter should work properly in newer PowerBooks and has been used successfully in the G4 Titanium.

Connecting to Layla24's Rack-mount Audio Interface

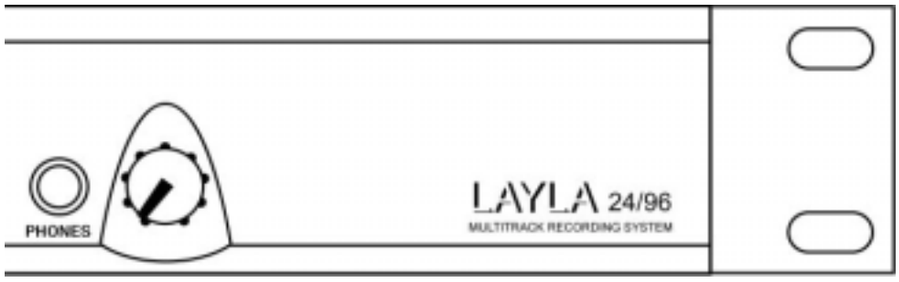
The back panel of Layla24's rack-mount audio interface contains a wide variety of connections that allow great flexibility in the operation of Layla24. For optimal performance with Layla24, it is critical to use the appropriate cabling and connectors.

Analog Inputs and Outputs

Layla24 has eight analog inputs and eight analog outputs on the rear panel. The input and output connections can accept unbalanced or balanced signals via ¼" connectors. For more information see "Unbalanced and Balanced Inputs and Outputs" in Appendix C.

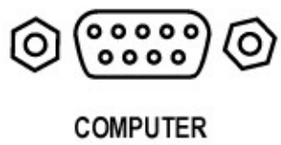


Layla24's front panel has a ¼" headphone output jack with a corresponding volume knob which monitors analog outputs 1 and 2.



The Computer Connector

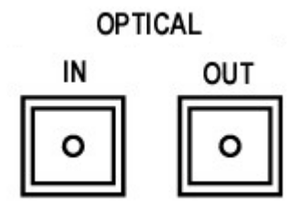
Next to the analog inputs and outputs is a connector labeled **COMPUTER**. This connector is known as a DB-9, and is similar to the serial port on a PC. It is the point at which the audio interface connects to the Layla24 PCI card inside your computer.



A cable was supplied with your Layla24 for this purpose. This custom made cable is manufactured to certain specifications; if you need to replace it, you should only use a replacement cable from Echo.

ADAT / S/PDIF Optical I/O

Next to the **COMPUTER** connector is a pair of connectors labeled **OPTICAL, IN** and **OUT**. These connectors are used to transmit digital data among digital audio devices via an optical signal.

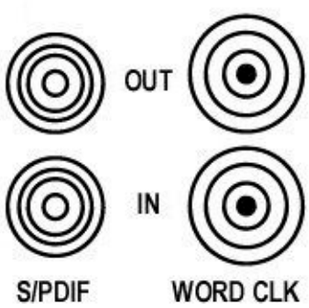


You can use this port for ADAT (8 channels) or for optical S/PDIF (stereo) I/O.

> **Note:** Layla24 is only capable of transmitting or receiving one type of digital signal at a time. You must choose either ADAT optical or S/PDIF (optical or RCA); you cannot use both simultaneously. The **Digital Mode Switch** can be found in the Layla24 Console. For more information, refer to the section of the manual that discusses the console.

S/PDIF

Next to the **ADAT** connectors is a pair of connectors labeled **S/PDIF**, **IN** and **OUT**. These S/PDIF connectors are used to transmit digital data among digital audio devices via an electrical signal. S/PDIF data can use the full 24-bit sample width used internally on Layla24.



When connecting devices to the S/PDIF jacks on Layla24, the use of standard analog RCA audio cables is not recommended. For reliable S/PDIF operation, 75-ohm coaxial (RG59) video cables are recommended.

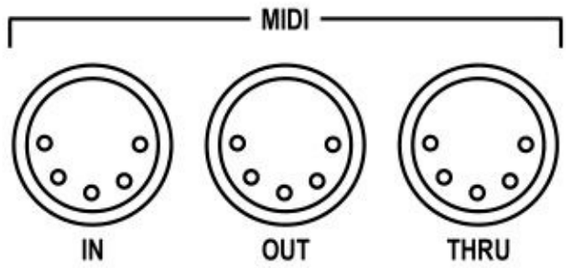
Word Clock

Next to the S/PDIF ports are the **Word Clock** connectors. These connectors allow you to synchronize one Layla24 to another Layla24, Layla, Mona or to other digital audio devices.

The Word Clock I/O uses a BNC connector. As with the S/PDIF I/O, a shielded 75-ohm (RG-59) coaxial video cable should be used. BNC connectors are widely used in the electronics industry for both video and computer networking. However, computer networks use 50-ohm (RG-58) coaxial cables and not the 75-ohm (RG-59) cable used by video. For reliable word clock operation, use only video grade cables with Layla24.

MIDI

The last set of connections to the Layla24 interface is for MIDI. The MIDI ports can be used for receiving MIDI time code (MTC), or sending MIDI signals from your digital audio/MIDI sequencing software to external sound modules, etc.



MIDI cabling is highly standardized and widely available.

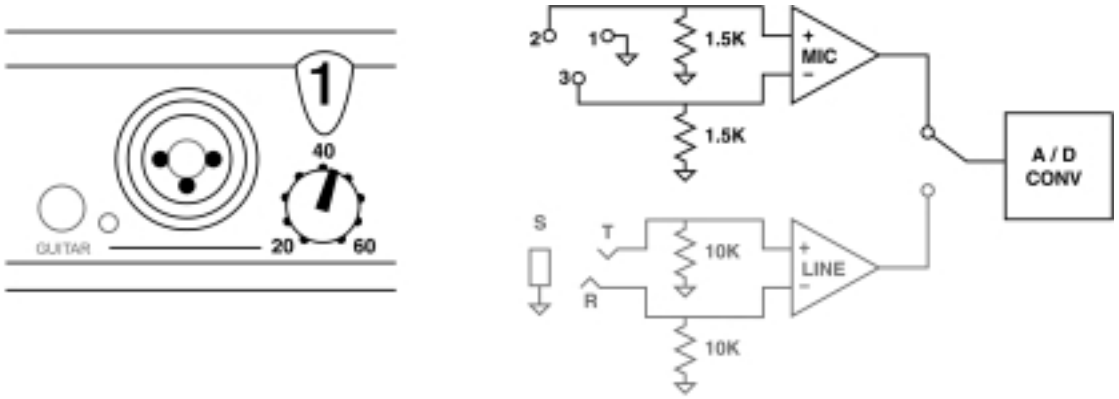
Connecting to Mona's Rack-mount Audio Interface

The back panel of Mona's rack-mount audio interface contains a wide variety of connections that allow great flexibility in the operation of Mona. To achieve the optimal performance with Mona, it is critical that the appropriate cabling and connectors are used.

Analog Inputs and Outputs

Mona has four analog inputs on the front panel, and six analog outputs on the back panel. The universal input connections can accept balanced or unbalanced signals via ¼" or XLR connectors. Since Mona has built-in preamps, you can just plug your microphone or guitar cable right into any of Mona's analog inputs. No external preamp or mixer is needed!!

Mona's "universal" inputs can be thought of as three inputs in one: a microphone input, a line input, and a guitar input.

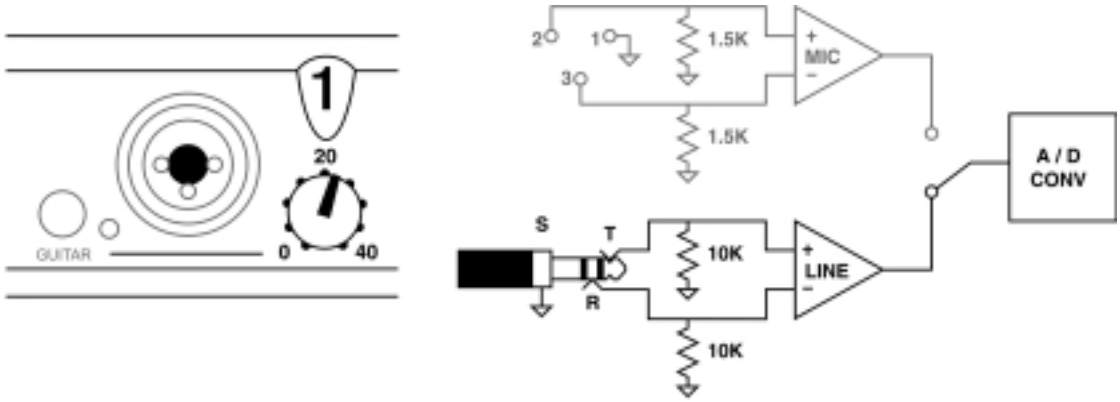


Mona's Mic Preamp Input (XLR, Impedance: 1.5K, Trim: 20 – 60dB)

To use a microphone with Mona, plug the microphone's XLR cable into any of the analog inputs. Whenever an XLR cable is connected to an input, the microphone preamp is enabled and the gain range of the trim knob is set to range from +20 to +60dB. The input impedance of the mic preamps is 1.5K.

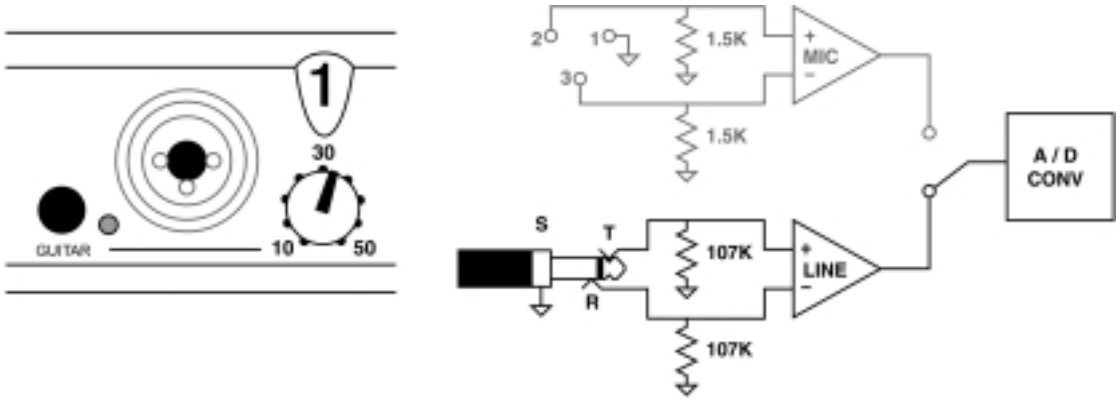
Mona provides 48 volts of phantom power for microphones that require it. To enable phantom power press the button labeled +48V (the LED next to it will light up) and phantom power will be provided to all microphone inputs.

> **Note:** Phantom power will not be applied to any line level equipment or guitars plugged in using ¼" connectors.



Mona's Line Input (1/4" TRS, Impedance: 10K, Trim: 0 – 40dB)

When a ¼" connector is plugged into Mona's universal input jack, the microphone preamp is disconnected and a line input amplifier is inserted in its place. If the **GUITAR** switch is out, the line input provides a balanced connection (for TRS plugs) and the trim knob has a range of 0 to 40dB. The input impedance for line-level signals is 10K. Full-scale input is 22dBu with the trim set to zero.



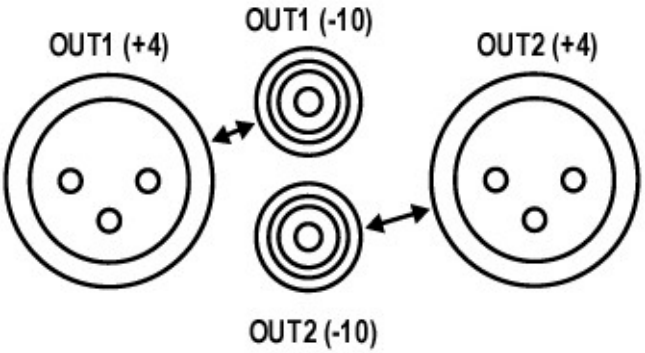
Mona's Guitar Input (1/4" Plug, Impedance: 107K, Trim: 10 – 50dB)

An input impedance of 10K is too low to record non-active guitar pickups, so each input also has its own **GUITAR** switch. When the **GUITAR** switch is pushed in (green indicator lit), the input impedance is increased to 107K and the trim knob has a range of 10 to 50dB. The indicator will only light up if there is a ¼" connector plugged into the jack. This mode will still provide a balanced input when a TRS connector is inserted.

If you want to adjust the level of any input, just turn the knob for that input and watch the corresponding level meter on Mona's front panel. The red bar at the top will light anytime the input signal is greater than –3dB (or within 3dB of clipping). The three yellow bars each represent a range of 3dB and the green bars each represent a range of 6dB.

For optimal audio quality, you should adjust the input trim (knob) so that your loudest recorded signal lights up some of the yellow bars, but not the red. If the signal level ever exceeds 0dB the signal will be "clipped" and you will hear a "pop" or "tick" in the recording. This is a *very bad thing*, and clipping should be avoided at all costs! Mona has enough headroom so that you can be conservative in this area and there is no need to push the input levels right up to the edge of clipping.

Mona's front panel also has a ¼" headphone output jack with a corresponding volume knob which monitors analog outputs 1 and 2.



Each of Mona's 6 outputs has one RCA and one XLR connector for your convenience. The RCA jack outputs a –10 dBV (unbalanced) signal, while the

XLR jack outputs a +4 dBu (balanced) signal. Both connectors are active at all times, so the output signal will always go out of both jacks.

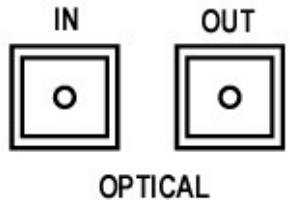
The Computer Connector

Next to the analog inputs and outputs is a connector labeled **COMPUTER**. This connector is known as a DB-9, and is similar to the serial port on a PC. It is the point at which the audio interface connects to the Mona PCI card inside your computer.

A cable was supplied with your Mona for this purpose. This custom made cable is manufactured to certain specifications; if you need to replace it, you should only use a replacement cable from Echo.

ADAT/S/PDIF optical I/O

Next to the **COMPUTER** connector is a pair of connectors labeled **OPTICAL, IN** and **OUT**. These connectors are used to transmit digital data among digital audio devices via an optical signal.

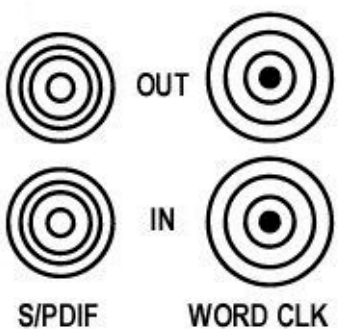


You can use this port for ADAT (8 channels) or for optical S/PDIF (stereo) I/O.

> **Note:** Mona is only capable of transmitting or receiving one type of digital signal at a time. You must choose either ADAT optical or S/PDIF (optical or RCA); you cannot use both simultaneously. Please refer to the Console section of this manual for more information.

S/PDIF

Next to the **ADAT** connectors is a pair of connectors labeled **S/PDIF**, **IN** and **OUT**. These S/PDIF connectors are used to transmit digital data among digital audio devices via an electrical signal. S/PDIF data can use the full 24-bit sample width used internally on Mona.



When connecting devices to the S/PDIF jacks on Mona, the use of standard analog RCA audio cables is not recommended. For reliable S/PDIF operation, 75ohm coaxial (RG59) video cables are recommended.

Word Clock

Next to the S/PDIF ports are the **Word Clock** connectors. These connectors allow you to synchronize one Mona to another Mona, Layla or Layla24 or to other digital audio devices.

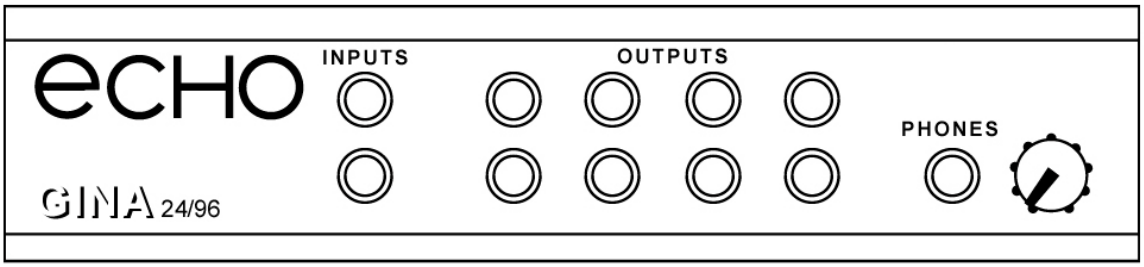
The word clock I/O uses a BNC connector. As with the S/PDIF I/O, a shielded 75-ohm (RG-59) coaxial video cable should be used. BNC connectors are widely used in the electronics industry for both video and computer networking. However, computer networks use 50-ohm (RG-58) coaxial cables and not the 75-ohm (RG-59) cable used by video. For reliable word clock operation, use only video grade cables with Mona.

Connecting to Gina24's Audio Interface

The back panel of Gina24's audio interface contains a wide variety of connections that allow great flexibility in the operation of Gina24. To achieve the optimal performance with Gina24, it is critical that the appropriate cabling and connectors are used.

Analog Inputs and Outputs

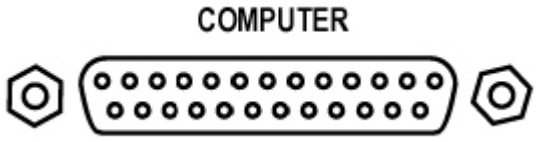
Gina24 has two analog inputs and eight analog outputs on the front panel. The input and output connections can accept balanced or unbalanced jacks via ¼" connectors. Both the inputs and outputs are set to receive or send a +4 dBu (balanced) signal.



Gina24's front panel also has a ¼" headphone output jack with a corresponding volume knob which monitors analog outputs 1 and 2.

The Computer Connector

On the back panel of the Gina24 audio interface box is a connector labeled **COMPUTER**. It is the point at which the audio interface connects to the Gina24 PCI card inside your computer.

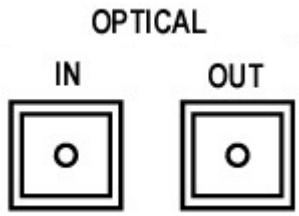


A cable was supplied with your Gina24 for this purpose. This custom made cable is manufactured to certain specifications; if you need to replace it, you should only use a replacement cable from Echo.

> ***Please Note:*** *The Gina24 cable is* ***NOT*** *interchangeable with Darla24 or Gina (20-bit) cables.*

ADAT/S/PDIF optical I/O

Next to the **COMPUTER** connector is a pair of connectors labeled **OPTICAL, IN** and **OUT**. These connectors are used to transmit digital data among digital audio devices via an optical signal.

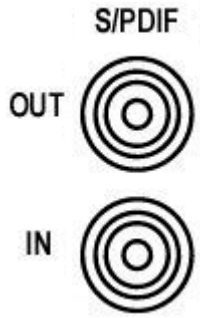


You can use this port for ADAT (8 channels) or for optical S/PDIF (stereo) I/O.

> **Note:** Gina24 is only capable of transmitting or receiving one type of digital signal at a time. You must choose either ADAT optical or S/PDIF (optical or RCA); you cannot use both simultaneously. The **Digital Mode Switch** can be found in the Gina24 Console. For more information, please refer to the console section of this manual.

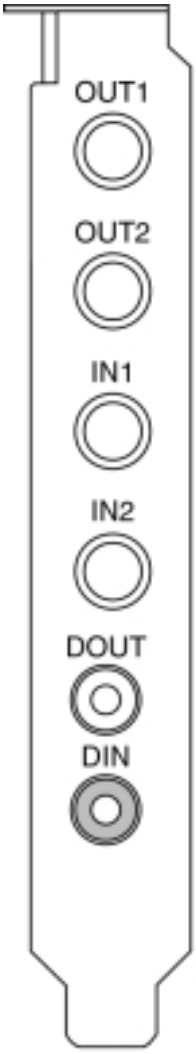
S/PDIF

Next to the **ADAT** connectors is a pair of connectors labeled **S/PDIF**, **IN** and **OUT**. These S/PDIF connectors are used to transmit digital data among digital audio devices via an electrical signal. S/PDIF data can use the full 24-bit sample width used internally on Gina24.



When connecting devices to the S/PDIF jacks on Gina24, the use of standard analog RCA audio cables is not recommended. For reliable S/PDIF operation, 75ohm coaxial (RG59) video cables are recommended.

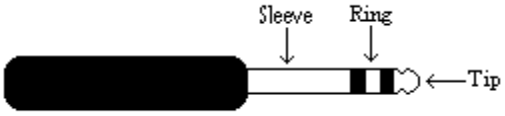
Connecting to Mia



Analog Inputs and Outputs

Mia has two analog outputs (OUT1 and OUT2) and two analog inputs (IN1 and IN2) on the back. The input and output connections can accept balanced or unbalanced jacks via ¼" connectors. Both the inputs and outputs are set to receive or send a +4 dBu (balanced) signal.

For optimum performance it is recommended that you use balanced signals when connecting to Mia's analog connectors. Mia uses TRS connectors (tip, ring sleeve) for connecting balanced line level signals.



The three sections of a TRS connector are used to transmit the three components of a balanced signal (T = plus, R = minus, S = ground). Mia will also accommodate the two conductor unbalanced style connector.

S/PDIF Digital Inputs and Outputs

Under the analog connectors is a pair of connectors labeled **DOUT** and **DIN**. These S/PDIF connectors are used to transmit digital data among digital audio devices via an electrical signal. S/PDIF data can use the full 24-bit sample width used internally on Mia.

When connecting devices to the S/PDIF jacks on Mia, the use of standard analog RCA audio cables is not recommended. For reliable S/PDIF operation, 75ohm coaxial (RG59) video cables are recommended.

ASIO Driver Installation & Configuration

Now that you've run the Echo24 Card Installer program, you will need to manually install the **ASIO Echo24** driver. On the Macintosh, Echo hardware only currently supports ASIO; Sound Manager is not supported.

1. **Find it.** Find the **ASIO Echo24** file in the newly created **Echo** folder.

2. **Copy it.** Create a copy of this file. You will need one copy for every ASIO based software program you have installed. You can copy it by dragging it to the desktop (or another folder) while holding down the **option** key.

3. **Move it.** Put a copy of the **ASIO Echo24** file into the **ASIO Drivers** folder of your ASIO based software program. You will need to do this separately for each ASIO based software program you have installed.

4. **Configure it.** You will now need to select and configure the **ASIO Echo24** driver from within your ASIO based software program. Please refer to the manual for your ASIO based software on how to do this.

This completes the installation of the hardware and software for Gina24, Mia, and Mona. Layla24 users should read the following section on OMS setup for MIDI.

OMS Setup (Layla24 Only)

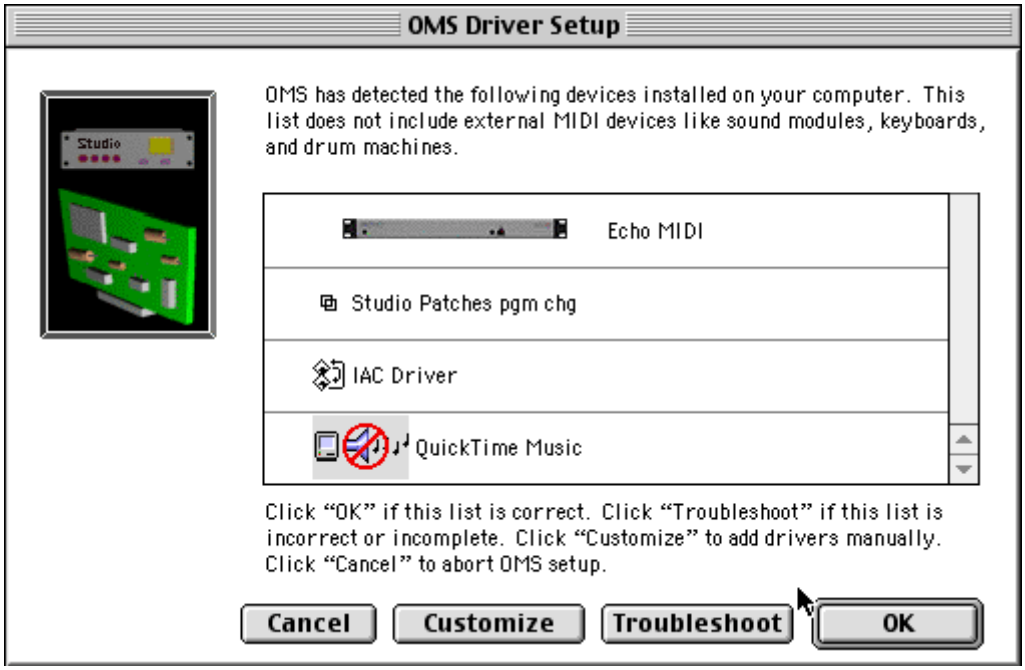
If you want to use MIDI input and output on your Layla24, you will need to use Opcode's OMS.

1. **Install OMS**. OMS is included on the CD that came with your Echo product; just open the OMS folder and double-click the installer.

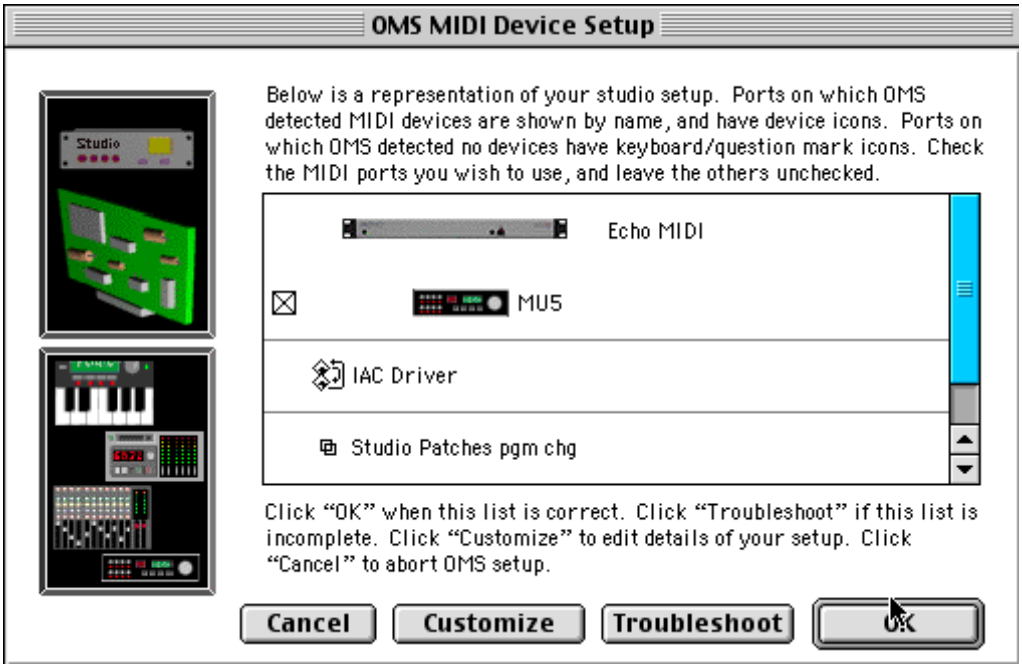
2. **Run OMS Setup.** Now, you will need to find the **Opcode** folder on your hard drive where you installed OMS. Open it and then open the folder called **OMS Applications**. Find **OMS Setup** and double click it.

Create a New Studio Setup
A studio setup document is a list of your MIDI devices and cables between them.
You use it to tell applications what's in your studio.
Click OK to have OMS automatically locate your MIDI devices and build a new studio setup document.
Cancel
OK

3. **Create a New Studio Setup.** Go to the **File** menu and click **New Studio Setup**. Click **OK**. A new window will come up. Click **Search**. OMS will search for any new equipment, and then you should see Layla24 recognized in a window like this:

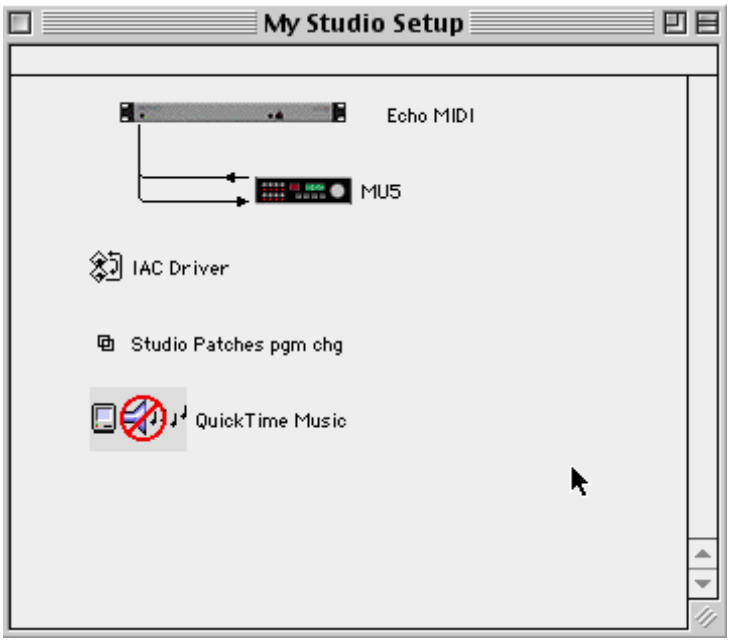

OMS Driver Setup
Studio
OMS has detected the following devices installed on your computer. This list does not include external MIDI devices like sound modules, keyboards, and drum machines.
Echo MIDI
Studio Patches pgm chg
IAC Driver
QuickTime Music
Click "OK" if this list is correct. Click "Troubleshoot" if this list is incorrect or incomplete. Click "Customize" to add drivers manually. Click "Cancel" to abort OMS setup.
Cancel
Customize
Troubleshoot
OK

4. **Verify that the Echo OMS driver is recognized.** The **OMS Driver Setup** window recognizes MIDI hardware drivers in your system. If there is something missing, then refer to your OMS manual and follow the instructions. If everything is OK, then click **OK**. Now you will see the **OMS MIDI Device Setup** window.


OMS MIDI Device Setup
Below is a representation of your studio setup. Ports on which OMS detected MIDI devices are shown by name, and have device icons. Ports on which OMS detected no devices have keyboard/question mark icons. Check the MIDI ports you wish to use, and leave the others unchecked.
Studio
Echo MIDI
MU5
IAC Driver
Studio Patches pgm chg
Click "OK" when this list is correct. Click "Troubleshoot" if this list is incomplete. Click "Customize" to edit details of your setup. Click "Cancel" to abort OMS setup.
Cancel
Customize
Troubleshoot
OK

5. **Verify that your MIDI devices are recognized.** This window recognizes any MIDI devices (like synthesizers) currently attached to your system through your MIDI hardware (like Layla24). In the example you can see that an MU5 Tone Generator is attached to the system through Layla24. Scroll down and make sure everything is OK. If there is a problem, or you need to edit your setup, then refer to your OMS manual for instructions. If all is well, click **OK**.

6. **Save the new studio setup.** Now you will be asked to save the new studio setup. You can overwrite your old setup with the same name or create a new one. Click **Save** when you're done and you'll see a window displaying your new setup.



7. **Test it.** If you want to test your new setup, go to the **Studio** menu and click **Test Studio**. Your mouse pointer will turn into a musical note. In the Setup window, click on a tone generator or synthesizer. If it's turned on and hooked up properly, then you should hear a sound coming out of the MIDI device's outputs. If you do, then you're all done.

Install Cubasis

Your Echo hardware comes with Steinberg's Cubasis VST. This is a great way to get started with digital recording.

To install Cubasis VST:

1. **Insert the CD.** Insert the Echo CD-ROM into your Mac and open the "Cubasis VST" folder.

2. **Run the installer.** Double-click on the "Cubasis OEM Installer" and follow the instructions.

3. **Copy the ASIO driver.** Once Cubasis is installed, copy the ASIO driver from the "Echo" folder on your hard disk into the "ASIO Drivers" folder under the "Cubasis folder".

4. **Configure Cubasis.** Double-click the Cubasis icon. From within Cubasis, select "Options/Audio Setup/System…" Now, for "ASIO Device", select "ASIO Echo24."

You can now use your Echo hardware with Cubasis on your Macintosh. You can learn more about Cubasis from the online documentation, which you should find in the "Documentation" folder under the Cubasis folder.

If you intend to use any other ASIO-compatible audio software, you will need to copy the ASIO driver into the "ASIO Drivers" folder for each application you want to use.

The Console – Gina24, Layla24, and Mona

A “virtual control surface” application called the Console is included with the Mac driver. The Console allows you to control the audio I/O and clocking functions of your Echo hardware, and it brings these controls to a single easy-to-use location. From the console you can control the output levels, select synchronization clocks, select the digital mode, and adjust input monitoring.

Running the console

Once you have run the installer, you will find the console in a folder called “Echo” on your hard drive. Double-click on the icon labeled “Echo24 Console”.

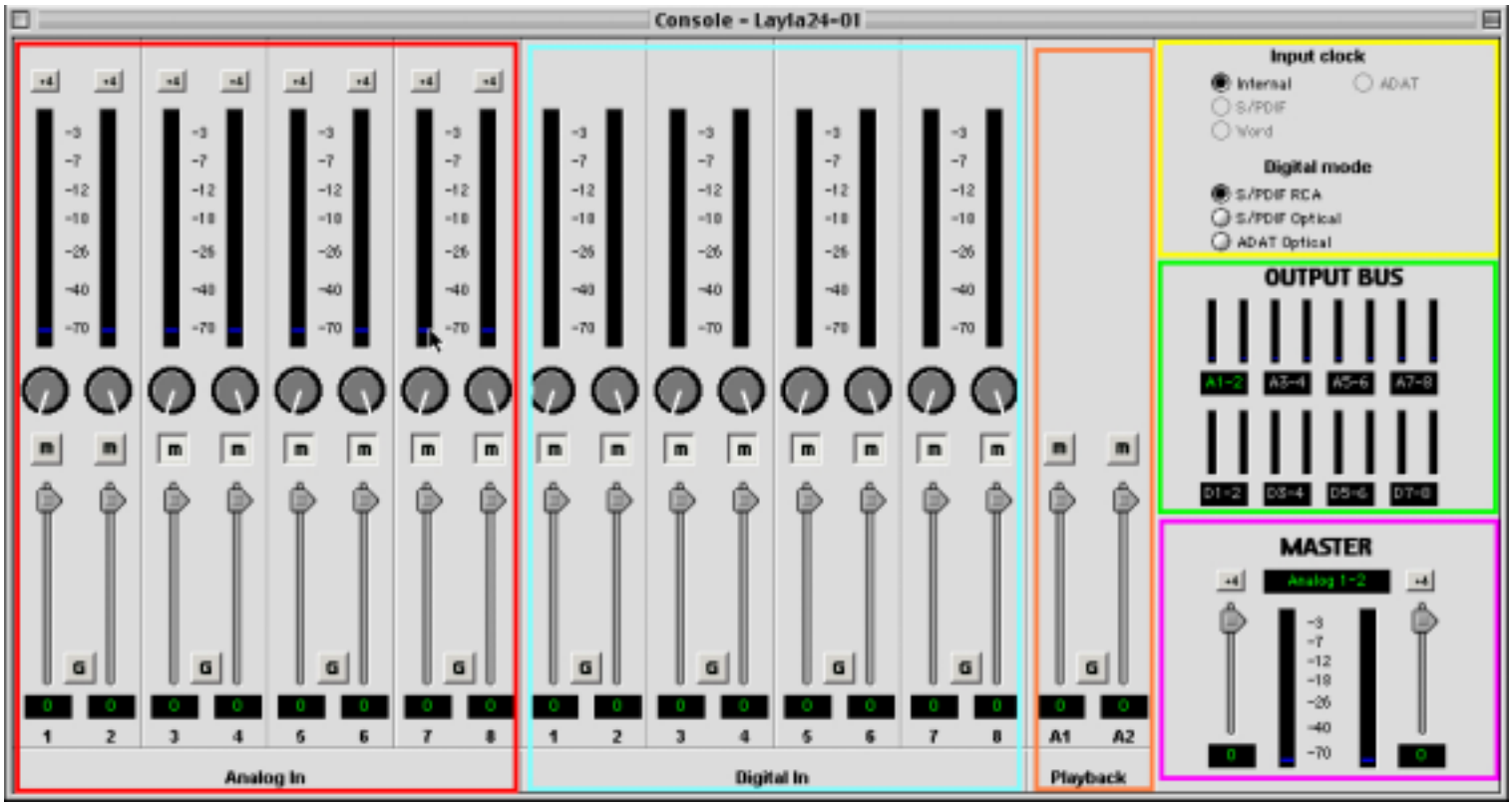
The console window

The basic metaphor for the console interface is a digital mixing board. It works in terms of *output busses*. An output bus is a stereo pair of outputs on your hardware; for example, analog outputs 1 and 2. The console window allows you to 1) select an output bus and 2) control what is mixed and sent to that output bus.

The following may be mixed to an output bus:

- Any analog input
- Any digital input

Here's a picture of the console for Layla24 (Gina24 and Mona are similar)



Bus select: The bus select panel is the area outlined in **green**. Eight different output busses are shown here: four analog busses in the top row and four digital busses on the bottom row. Each bus has its own button marked with either an A or D (Analog or Digital) and a channel number pair. The highlighted button is the currently active bus. All monitor controls remain in effect even when not displayed by maintaining a level setting for each monitor path it controls. Clicking on an output bus button simply selects the settings that are displayed. In this case, Analog 1-2 (A 1-2) is the active bus. This means all input monitor parameters such as volume, pan, and mute apply to the audio coming out Analog outputs 1 and 2 of Layla24. To select an output bus, click on one of the buttons.

Master output bus control: The master bus control is the area outlined in **purple**. At the bottom is the label "Analog out 1-2." This indicates you are

currently controlling everything mixed to analog outputs 1 and 2. These channels correspond to the currently selected button on the bus select panel.

The two buttons labeled "+4" are the *nominal level* select buttons. Since they both read "+4," this indicates these outputs are sending a +4dBu (professional level) signal. To send a –10dBV (consumer level) signal, click the button. This feature allows you to connect either professional or consumer gear to each output.

Mona does not include "nominal level buttons" here. This is because Mona's RCA connectors always output a -10 dBV (consumer) signal, and the XLR connectors always output a +4 dBu (professional) signal.

The *mute buttons* and *faders* affect everything being mixed to this bus. Thus, pulling the fader down will make both the input monitors and playback quieter.

The *gang button*, marked with a "G," sets the gang mode. If you are in gang mode, the mute buttons and nominal level buttons will work together; for example, clicking the mute on one channel activates the mute button on the other channel. Also, ganging the faders ties them together so they will maintain their relative placement with regard to each other.

Analog inputs: The controls for the analog inputs are outlined in **red** and have the label "Analog in" at the bottom. There is one strip, or *input monitor*, corresponding to each of Layla24's eight physical analog inputs. The controls affect the audio going to the currently selected output bus; in this case audio is sent to outputs Analog 1 and 2.

The topmost control is a button labeled "+4"; this button allows you to select the nominal level for this analog input. Since the button currently reads "+4," it is ready to accept a +4 dB signal. Click the button to change this input to –10 mode. This button will affect the level of what you record as well as the monitor level. Mona does not include the "nominal level"

buttons here either; this is because Mona's input level is controlled on its audio interface box.

Below the "nominal level" button is the peak meter for this channel, labeled in decibels. The red segment of the peak meter starts at –3 dB and the yellow starts at –12 dB. Under the peak meter is the monitor pan slider; this pans the input channel between the two channels of the output bus. Holding down the Ctrl key and clicking on a pan slider will set the slider to the center position. Note that this does not affect your recording. Below the pan slider is the monitor mute. This controls whether or not you want this input channel to be mixed directly out to the currently selected output bus. Again, this does not affect recording. This is followed by the monitor fader, and it controls the input monitor level. Like the pan and mute controls, this does not affect your record level. Also, clicking on the readout below the fader will allow you to numerically enter a fader setting.

The analog inputs also have gang buttons, and their operation is the same as the gang button for the master outputs.

Digital inputs: The controls for the digital inputs are outlined in light **blue** and have the label "digital in" at the bottom. Their operation is identical to the analog input controls except the digital input controls don't include a nominal level button.

For Layla24, Gina24 and Mona, whether you are monitoring the S/PDIF or the ADAT inputs depends upon the digital mode you have selected. If you are in either S/PDIF mode, the S/PDIF inputs will come in digital inputs 1 and 2. If you are in ADAT mode, the ADAT signal will come in on all eight digital inputs.

Playback strips: The controls for the level of audio being played by an application are outlined in **orange** and have the label "playback" at the bottom. Notice you cannot pan or otherwise redirect here; if you are playing out of analog 1 and 2 from your application, it will only be sent to that same bus.

Clock and digital mode settings: The area within the **yellow** outline on the upper right lets you select your sync source and digital mode. If a given clock is detected, the green indicator next to the clock button will light up. You will only be allowed to select clocks that have been detected. Also, you may only select the digital mode if the there aren't any applications actively playing or recording.

Note: Sample rates above 48kHz will not be available while ADAT mode is selected. This is because ADAT does not support sample rates higher than 48kHz.

Menus

You can set your S/PDIF output format by selecting File/Preferences. This lets you configure your card for professional or consumer format S/PDIF output. Some S/PDIF devices need to see one format or another; if you are having trouble connecting a S/PDIF device to the digital output of your Echo card, try changing this setting.

The "Active Card" menu is used when you have more than one Echo card; use this menu to switch between the different cards.

Shortcuts

Shift-drag: Holding down the Shift key and dragging a fader will invert the current gang state. If a fader is ganged, shift-dragging will treat the fader as if it were unganged and vice versa.

Quick 0 dB: Holding down the Command key and clicking on a fader will set that fader to 0 dB.

Center pan: Holding down the Command key and clicking on a pan slider will set the slider to the center position.

The Console - Mia

A “virtual control surface” application called the Console is included with the Mac driver. The Console allows you to control the audio I/O and clocking functions of your Echo hardware, and it brings these controls to a single easy-to-use location. From the console you can control the output levels, select synchronization clocks, select the digital mode, and adjust input monitoring.

Running the console

Once you have run the installer, you will find the console in a folder called “Echo” on your hard drive. Double-click on the icon labeled “Echo24 Console”.

The console window

The basic metaphor for the console interface is a digital mixing board. It works in terms of *output busses*. An output bus is a stereo pair of outputs on your hardware; for example, analog outputs 1 and 2. The console window allows you to 1) select an output bus and 2) control what is mixed and sent to that output bus.

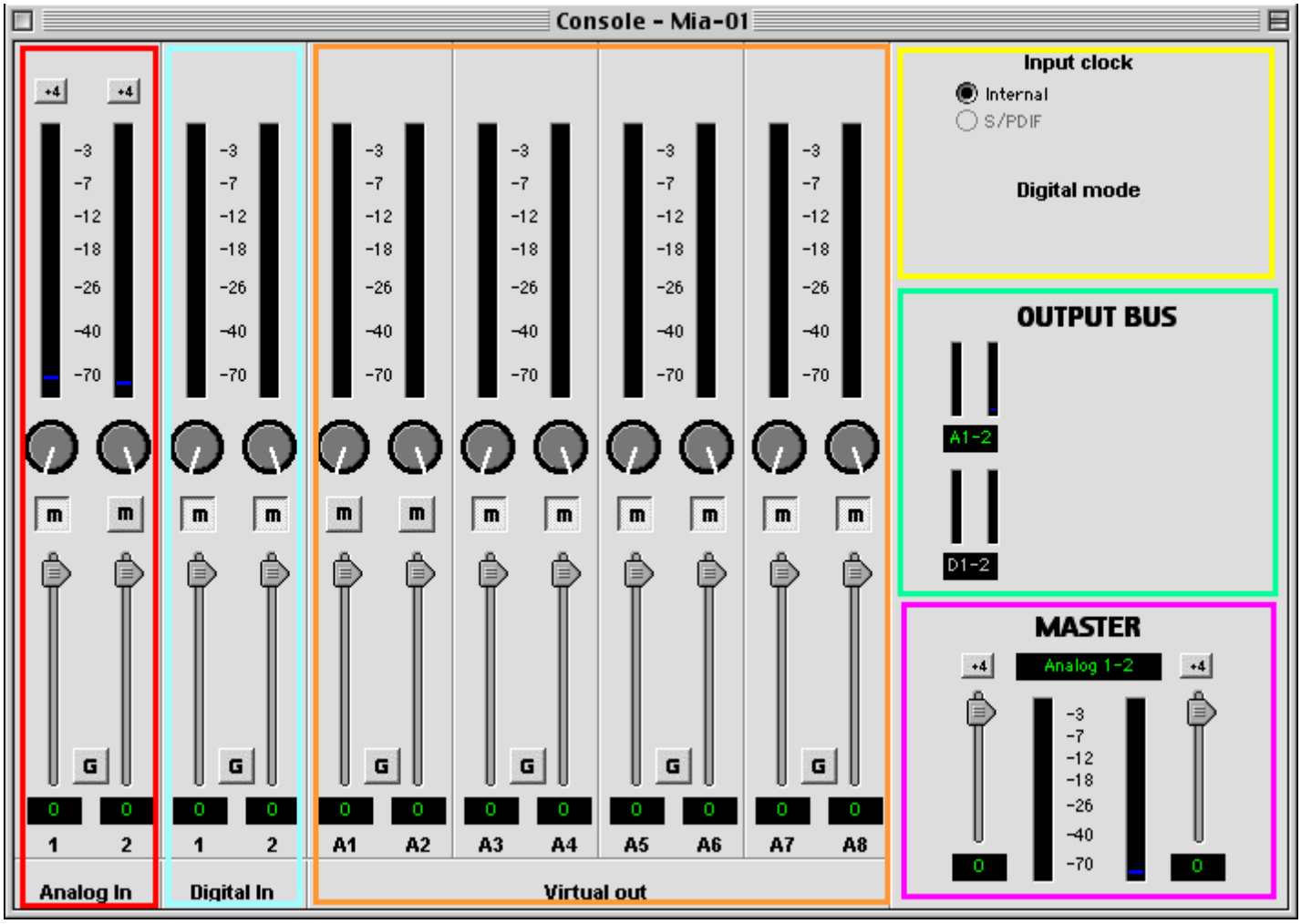
The following may be mixed to an output bus:

- Any analog input
- Any digital input
- Any virtual output

Mia’s most unique feature is the virtual outputs – audio software is presented with eight separate outputs. Using the console, you can configure Mia’s on-board digital mixer to mix those eight outputs to any of the analog

or digital outputs in any combination. You therefore have eight virtual outputs that are mixed down to the four physical outputs.

Here's a picture of the console for Mia:



Bus select: Let's start with the area within the **green** outline on the right. This is the bus select panel. Two different output busses are shown here: the analog output bus on top, and the digital output bus on the bottom row. Click on the label below the meters to select the bus.

Master output bus control: Now, let's consider the area in the **purple** outline on the lower right. This is the *master bus control*.

At the top of this area you will see the label “Analog out 1-2”. This indicates that you are currently controlling everything that will be mixed out to analog outputs 1 and 2, which corresponds to the green “A 1-2” on the bus select panel.

The two buttons labeled “+4” are the *nominal level select* buttons. Since they both read “+4”, this indicates that these outputs are sending a +4 signal. To send a –10 signal, click the button.

The *mute buttons* and *faders* affect everything being mixed to this bus; that is, pulling the fader down will make both the input monitors and playback quieter.

Below each fader is a *readout* displaying the current fader setting. You may click on the readout and enter a gain value directly.

Analog inputs: Next up is the area all the way to the left within the **red** outline. This area is divided up into two vertical strips. These are the controls for the *analog inputs.* Since Mia only has two analog inputs, only two strips are shown. The controls on these strips have to do both with what you record and what you are listening too right now (i.e. the input monitor).

The topmost control is a button labeled “+4”; this button will allow you to select the nominal level for this analog input. Since the button currently reads “+4”, it is ready to accept a +4 signal. Click the button to change this input to –10 mode. This button will affect the level of what you record as well as the monitor level.

Below that is the *peak meter* for this channel. The red segment of the peak meter starts at –3 dB and the yellow starts at –12 dB.

Next is the *monitor pan knob;* this pans the input channel between the two channels of the output bus. Note that this does **not** affect what you record.

Next is the *monitor mute*. This controls whether or not you want this input channel to be mixed directly back out to the currently selected output bus. Again, this does not affect recording.

This is followed by the *monitor fader*. This controls the input monitor level. Once again, this does not affect your record level.

The button marked "G" between each fader is the gang button. If you click on the gang button, that pair of faders will be in gang mode and will move together when you move one or the other.

Digital inputs: These are within the light **blue** outline. They work just like the analog inputs, but represent Mia's S/PDIF inputs.

Playback strips: The area within the **orange** outline controls the level of audio being played by an application. These control the eight virtual outputs that Mia's ASIO driver presents to audio applications. Use the faders, mutes, and pans to mix the virtual outputs out to the physical outputs.

Note that Mia defaults to virtual output 1/2 routed to the analog outputs and virtual output 3/4 routed to the digital outputs. If you don't want to use the virtual output feature, just use output 1/2 as your analog outputs and 3/4 for your digital outputs.

Clock setting: The area within the **yellow** outline on the upper right lets you select your sync source and digital mode. If a given clock is detected, the green indicator next to the clock button will light up. You will only be allowed to select clocks that have been detected.

Menus

You can set your S/PDIF output format by selecting File/Preferences. This lets you configure your card for professional or consumer format S/PDIF output. Some S/PDIF devices need to see one format or another. If you are having trouble connecting a S/PDIF device to the digital output of your Echo card, try changing this setting.

The “Active Card” menu is used when you have more than one Mia; use this menu to switch between the different cards.

Shortcuts

Shift-drag: Holding down the Shift key and dragging a fader will invert the current gang state. If a fader is ganged, shift-dragging will treat the fader as if it were unganged and vice versa.

Quick 0 dB: Holding down the Command key and clicking on a fader will set that fader to 0 dB.

Center pan: Holding down the Command key and clicking on a pan slider will set the slider to the center position.

Synchronizing Multiple Devices

Layla24, Mona, Gina24 and Mia are designed to work alongside other audio equipment. If you are planning on using your card with other audio equipment, please note the following:

The Mac drivers included in this package support multiple Echo cards within the same system. In addition, your new Echo hardware will operate alongside other Echo products. Echo hardware can also peacefully coexist with audio equipment from other manufacturers, but be aware that operating *alongside* another product is not the same as operating *with* it. In order for accurate synchronization to occur, the other audio product(s) in your system must support a synchronization mode that is compatible with your particular Echo hardware. Without such synchronization, the individual pieces of equipment will act independently of each other. This scenario may be fine for some musical applications; however, it is not appropriate for situations where sample-accurate synchronization is required or that will be affected by clock drift.

Let's take a brief look at the various synchronization types.

Word Clock – This is a synchronization signal that connects to the BNC connector labeled **Word Clock** on Layla24/Mona's back panel. This synchronization clock runs at the selected sample rate. Think of it as a kind of electronic metronome, which clicks back and forth at the digital sample rate. It is one of the most widely used forms of synchronization in digital audio. Layla24/Mona is always generating Word Clock on its Word Clock output BNC connector. Although it can generate Word Clock at any sample rate it is set to, Layla24/Mona can only sync to Word Clock if the master device is set to a sample rate between 30kHz and 100kHz. Otherwise you will get noise and/or loss of sync.

S/PDIF – The Sony/Phillips Digital Interchange Format is a serial bit-stream that has a clock signal embedded in the data stream. When recording from an S/PDIF source, whether via optical cables or RCA cables, Echo products will utilize the synchronization clock that is embedded in the S/PDIF while it decodes the bitstream. Your Echo digital audio system can

only sync to S/PDIF clock if the master device is set to a sample rate between 30kHz and 50kHz. Otherwise you will get noise and/or loss of sync.

Note: When recording from a S/PDIF port, you must select **S/PDIF** as the input clock. For greater flexibility, this is not done automatically. If you find that your S/PDIF recordings contain pops or skips, be sure that you have selected **S/PDIF** as your input clock.

ADAT – (Layla24/Mona/Gina24) The Alesis ADAT optical interface can send and receive up to 8 simultaneous channels of digital audio data over fiber optic cables. Unlike wire cables, fiber optic cables do not add noise or interference. Layla24/Mona/Gina24 can send out (or "master") ADAT clock as well slave to it. If you want the interface to slave to an ADAT clock, just set the input clock to the **ADAT** setting. Layla24/Mona/Gina24 can only sync to ADAT clock if the master device is set to a sample rate between 40kHz and 50kHz. Otherwise you will get noise and/or loss of sync.

Note: To preserve the high audio quality of Layla24/Mona/Gina24's converters it is best to use the **Internal** input clock setting instead of synchronizing to an external ADAT clock, which may add unwanted jitter to the signal.

Esync – Esync is a proprietary form of super clock that is used to synchronize two or more Echo 24-bit products like Layla24, Mona, Gina24, and Darla24. While Gina24 and Darla24 have both input and output connectors on their PCI cards, Layla24 and Mona only have the Esync output connectors, and Mia has no Esync connectors.
Layla24/Mona/Gina24 is always outputting Esync clock.

Now let's take a look at some sample configurations and how you might set them up from a synchronization standpoint.

Let's start simple. Suppose that Layla24 is the only audio device used in your system. Since you have no other devices to synchronize with, simply select **Internal** for Layla24's input clock. Layla24 will then use its own clock to control its operation.

Now a little more complicated set-up: You have two Layla24s connected. Simply set Layla24 #1 to **Internal** for its input clock. Now connect the first Layla24 to the second one via a BNC cable running from Word Clock Out on Layla24 #1 to Word Clock In on Layla24 #2. Now select **Word** for Layla24 #2's input sync. The second Layla24 will slave to the first one and your Layla24s will now operate in unison.

No matter how many devices you are synchronizing, the concept is essentially the same. You are merely "daisy-chaining" devices together using compatible clocks. One device will operate as the source of the master clock, with each successive device using that clock to sync.

ASIO Direct Monitoring

Depending on what software you use, you will have different options for monitoring your audio inputs. The more common type is software monitoring. With software monitoring, your audio application handles mixing inputs to outputs internally (i.e., on the PowerPC processor). Typically, this adds latency, meaning that the audio you hear on the outputs is delayed from the inputs.

Your Echo hardware has an on-board DSP chip which can also handle mixing inputs to outputs. Since this is done on the DSP, it lightens the load on the PowerPC chip and has virtually no latency. This is referred to as hardware monitoring. Hardware monitors can be controlled from the Console.

With the advent of ASIO 2.0, software programs can control the hardware monitors directly. This is called **ASIO Direct Monitoring**. The ASIO driver for Mia supports Direct Monitoring. However, not all ASIO based programs support Direct Monitoring. Cubase VST version 4.1 (or higher) is one program that does support **Direct Monitoring**.

Things can get a little tricky, however, if you try to control your monitors simultaneously in the console and in your audio software. Your best bet is to pick one or the other and stick with it. The monitor controls in the Console and the monitor controls within your audio software can't communicate with each other, so your monitors may behave unpredictably if you switch back and forth during a session.

Here are a few different scenarios for monitoring your inputs:

I want to just listen to my inputs without using any audio software

Run the Console and control your monitors from there.

I want to use Direct Monitoring

Use Direct Monitoring in your software, but don't use the Console for monitoring. Only use the Console for clock synchronization.

I want to use software monitoring

Run the Console and mute all the monitors. This will disable hardware monitoring. Using hardware and software monitoring simultaneously won't hurt anything, but you'll get a noticeable delay effect in your outputs (kind of like a slapback echo) since the hardware and software monitors have different latencies.

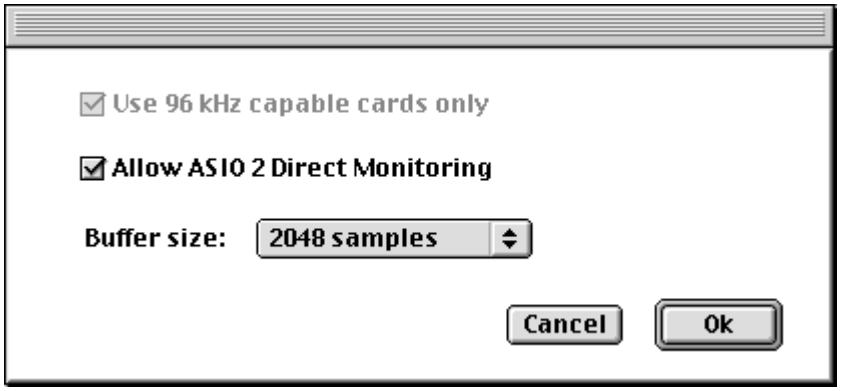
The best method, therefore, is to mute the monitors in the console and to control your software monitoring from within your audio application.

No matter which type of monitoring you use, if you choose to use either the software or hardware monitoring within your ASIO program, this will determine how you should use the Console. If you use your ASIO program for monitoring, then you should only use the Console for setting the **Input Clock**. If you use both your ASIO program and the Console for monitoring, the Echo24 ASIO driver will get confused (this is bad).

Finally, please note that when using DirectMonitoring on Mia, any signal that you select to monitor will be automatically sent to both the analog and digital outputs.

ASIO Control Panel

In all ASIO programs you can access the ASIO control panel that lets you control certain driver settings for your Echo24 card. Each ASIO program has a different name for it (ASIO Device Control Panel, Hardware Settings, Driver Setup, etc…) and a different way of accessing it.



The "Allow ASIO 2 Direct Monitoring" checkbox does exactly what it say it does. If you don't want the option of using Direct Monitoring, then make sure this box is unchecked.

The last control is labeled "Buffer size,**"** which allows you to change the buffer size so you can get lower latency. Generally, a smaller buffer size will result in a lower latency. However, the speed of your computer processor may also affect this. If you have a really slow machine, then using a very small buffer size may cause you to have breakups in your audio. If this happens, then just make the buffer size larger until you no longer hear the breakups.

The topmost setting, "Use 96 kHz capable cards only," doesn't apply to just using one Echo card by itself. This setting only applies in the following scenario:

- You want to play and record at 88.2 or 96 kHz
- You have at least two of the following installed: Gina24, Layla24, Mona, or Mia.

Say, for example, you have a Layla24 and a Mona. Congratulations on your superb taste in purchasing not one but *two* Echo products.

However, say you set Layla24 to ADAT mode and Mona to S/PDIF mode. In ADAT mode, Layla24 will be limited to 48 kHz, while Mona in S/PDIF mode will be able to go up to 96 kHz.

This, in turn, presents the ASIO driver with a problem. If you're trying to use both Layla24 and Mona at the same time, should ASIO applications be allowed to use 96 kHz?

The solution is the check box in the ASIO control panel (which was the whole point of this discussion, remember?). If you check the box, only the Mona will be listed in your ASIO application since it's the only hardware that can currently handle 96 kHz. If you uncheck the box, both Layla24 and Mona will be listed, but your ASIO application won't be allowed to use 96 kHz.

Contacting Customer Service

If you experience any trouble with your Echo hardware please go to the support area of our website at www.echoaudio.com and check out the tutorials & troubleshooting FAQ's we have there. If you can't find a solution to your problem there, please fill out the provided technical support email form. This form will be sent to our technical support staff and they will respond to you quickly. **Please fill out the form completely.** The best way to get the help that you need is by giving us plenty of detailed information about your computer system, your audio software and the problem you are having.

We do ask you to please read through this manual and the support area of our website before contacting us. You may also find an answer to your problem using the Appendices in the Mia owner's manual.

Thank you for buying an Echo product!

Contacting Steinberg Customer Service

> **Note:** All Cubasis VST support issues are handled solely by Steinberg. **Please do not call Echo Audio for technical support regarding Cubasis VST.**

You can reach Steinberg by selecting "Steinberg on the Web" from the pull down **Help** menu within Cubasis VST. This will automatically launch your Web browser, and take you to the Steinberg website. Simply click on the "Support" link, and then "Contact."

Appendix A: General Troubleshooting Guide

Problem: You can’t get Sound Manager to recognize your Echo card.

Solution: The current driver does not support Sound Manager. It only supports ASIO based programs.

Problem: You upgraded your computer with a processor upgrade card and now your Echo card doesn’t work.

Solution: Your Echo hardware is not compatible with processor upgrade cards. It only supports genuine Apple processors without upgrades. You will have to uninstall the processor upgrade card to get your Echo card to work again with your computer.

Problem: You can’t get your Echo card to work under OS X.

Solution: The current driver does not support OS X. It only supports OS 8.6 through 9.x.

Problem: You can’t get your Echo hardware to work with your iMac or G4 Cube.

Solution: The iMac and G4 Cube are not equipped with PCI expansion slots. PCI expansion or CardBus slots are required for you to install an Echo audio system.

Problem: You are unable to get your DAT recorder to recognize your Echo hardware’s S/PDIF output.

Solution: Digital information is transmitted in either of two modes, “professional” or “consumer.” The professional mode is usually

implemented in devices that are likely to be used in professional recording environments, whereas the consumer mode is commonly implemented on equipment designed for home use in the consumer market. The primary difference between the two modes is in the implementation of the SCMS copy protection bit, which, in the consumer format, prevents the user from making digital copies of a digital copy. In most professional equipment, this copy protection bit can be turned off or on according to the user's needs. In consumer products, the SCMS bit is always enabled.

Unfortunately there is no way for the transmitting device to automatically detect which format the receiving device is able to accept. If you have a DAT deck that is not able to read the S/PDIF output from your Echo card, chances are the card is transmitting in the mode that the deck is not equipped to handle.

We have provided a software switch in the driver that allows you to select which mode transmits. To access this switch go to the **Console**. In the **Options** menu select either **S/PDIF Pro** or **S/PDIF Consumer**. Select the appropriate format for your DAT (if you don't know which one to use, simply select the one that is not currently checked). Now try recording to your DAT again.

Important note: No Echo product transmits the SCMS bit; regardless of which mode is selected.

Problem: When you play an audio file, it plays at an altered pitch.

Solution: When your Echo card is set to sync with an external device, it will play back at the rate generated by that device. If the sound you are playing was sampled at 11kHz (for example), but you are synchronized with a device running at 44.1kHz, the sound will play back at this faster rate. You have four choices - ignore the altered pitch, switch to your Echo hardware's internal clock, change the sample rate of the external device, or use a different device for the sound playback.

Problem: Your Echo hardware doesn't seem to recognize the synchronization clock to which it is connected.

Solution: Although it may seem obvious, the first thing to check is that there is a physical connection between the device generating the clock and your Echo audio system. Just because multiple devices are connected to the same computer doesn't mean they are synchronized. Next, be sure that you have selected the desired input clock source in the **Console**.

Problem: Recordings made using the S/PDIF port contain occasional pops or skips.

Solution: When recording with the S/PDIF port, you must manually select the S/PDIF clock as the input clock. This can be done using the **Console**.

Problem: (Layla24, Mona, and Gina24**)** You keep hearing a high-pitched squealing sound or your S/PDIF or ADAT signal has gone crazy.

Solution: Reset the sample rate of your Echo card. You may have set the sample rate to 11kHz or 22kHz. Because neither S/PDIF nor ADAT support these rates, you will have problems syncing until you reset the sample rate to one within spec (like 44.1 or 48kHz). You can do this through your ASIO program's controls or by playing an audio file of the appropriate sample rate through your Echo hardware's outputs. Then you will be able to sync properly.

Problem: The sound cuts in and out, or the left or right channel doesn't work.

Solution: You may have a bad audio cable. Try using a different cable in the problem channel.

Problem: There is no sound unless I pull the audio plug out a little.

Solution: Not all ¼” plugs are made to the exact same dimensions. Try a plug/cable from a different manufacturer.

Appendix B: ASIO Audio Software FAQ

ASIO Software Compatibility List – 11/12/2001

Here is a list of ASIO-compatible applications that we have tested with:

Cubase 4.0
Cubase 5.0
Digital Performer 2.61, 2.7 and 3.0
Logic Audio 4.7 or better
Peak 2.1 and 2.7
Deck 2.7
Nuendo 1.5.2
Metro 5.0

Echo24 ASIO Driver and ASIO 2.0

Q: Can I use all Echo cards together at the same time in my ASIO program?

No. There are two different Echo ASIO drivers. One is for the older Echo hardware (Layla, Gina, Darla & Darla24). The other is for the new hardware (Gina24, Layla24, Mia & Mona). However, you can use multiple cards from either group, just not a combination from both groups.

Q: What does ASIO 2.0 support do for me?

For our purposes, ASIO 2.0 adds ASIO Direct Monitoring. ASIO Direct Monitoring lets you control the monitoring features of your Echo card (low latency hardware monitoring) from within your ASIO program. Cubase VST version 4.1 is the first program to support Direct Monitoring, but other ASIO programs will probably support this feature in the future.

Appendix C: Introduction to Digital Recording

Converting Sound into Numbers

In a digital recording system, sound is represented as a series of numbers, with each number representing the voltage, or amplitude, of a sound wave at a particular moment in time. The numbers are generated by an *analog-to-digital converter*, or ADC, which converts the signal from an analog audio source (such as a guitar or a microphone) connected to its input into numbers. The ADC reads the input signal several thousand times a second, and outputs a number based on the input that is read. This number is called a *sample*. The number of samples taken per second is called the *sample rate*.

On playback, the process happens in reverse: The series of numbers is played back through a *digital-to-analog converter*, or DAC, which converts the numbers back into an analog signal. This signal can then be sent to an amplifier and speakers for listening.

In computers, *binary numbers* are used to store the values that make up the samples. Only two characters, 1 and 0, are used. The value of a character depends on its place in the number, just as in the familiar decimal system. Here are a few binary/decimal equivalents:

BINARY	DECIMAL
0000000000000000	0
0000000000000001	1
0000000000000010	2
0000000000000100	4
0000000000001000	8
1111111111111111	65,535

Figure A. Binary numbers and their decimal equivalents

Each digit in the number is called a *bit*, so the numbers in *Figure A* are sixteen bits long, and the maximum value which can be represented is 65,535.

Sample Size

The more bits that are used to store the sampled value, the more closely it will represent the source signal. In an 8-bit system, there are 256 possible combinations of zeroes and ones, so 256 different analog voltages can be represented. A 16-bit system provides 65,535 possible combinations. A 16-bit signal is capable of providing far greater accuracy than an 8-bit signal. *Figure B* shows how this works.

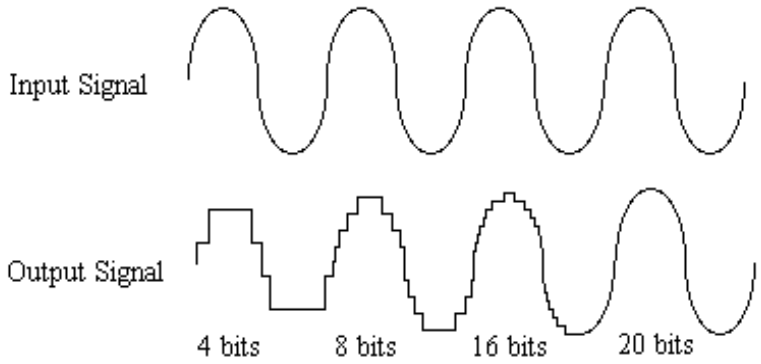


Figure B. The more bits there are available, the more accurate the representation of the signal and the greater the dynamic range.

Your Echo hardware's analog inputs use 24-bit ADCs, which means that the incoming signal can be represented by any of over 16 million possible values. The output DACs are also 24-bit; again, over 16 million values are possible. The S/PDIF inputs and outputs also support signals with up to 24-bit resolution. Your Echo hardware processes signals internally with 24-bit resolution to insure that there is no degradation to the audio signal as it is processed through the system.

The number of bits available also determines the potential dynamic range. Moving a binary number one space to the left multiplies the value by two (just as moving a decimal number one space to the left multiplies the value by ten), so each additional bit doubles the maximum value that may be represented. Each available bit provides 6dB (see decibel section below) of dynamic range. For example, a 24-bit system can theoretically provide 144dB of dynamic range.

Sample Rate

The rate at which the ADC generates the numbers is equally important in determining the quality of a digital recording. To get a high level of accuracy when sampling, the sample rate must be greater than twice the frequency being sampled. The mathematical statement of this is called the Nyquist Theorem. When dealing with full-bandwidth sound (20Hz–20kHz), you should sample at greater than 40,000 times per second (twice 20kHz). Your Echo hardware allows you to sample at rates up to 96,000 times per second.

If the sampling rate is lower than the frequency you are trying to record, entire cycles of the waveform will be missed, and the result will not resemble the proper waveform. When the sample rate is too low, the resulting sound has diminished high frequency content.

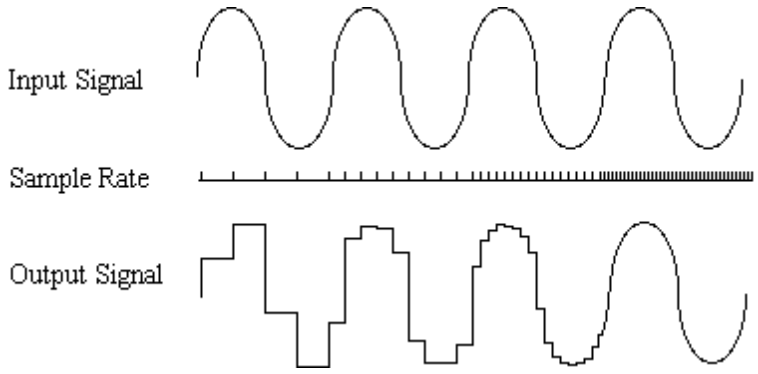


Figure C. Increased sample rates yield a more accurate reproduction of the source signal.

By the way, the circuits that generate the sample rate must be exceedingly accurate. Any difference between the sample rate used for recording and the rate used at playback will change the pitch of the recording, just as with an analog tape playing at the wrong speed. Also, any unsteadiness, or jitter, in the sample clock will distort the signal as it is being converted from or to analog form.

Storing Digital Data

Once the waveform has been transformed into digital bits, it must be stored. When sampling in stereo at 48kHz using a 20-bit word size, the system has to accommodate 1,920,000 bits per second. Though this is a lot of data, it is well within the capabilities of personal computers.

Most computer-based digital recording systems record the data directly to the computer's hard disk. Today's hard disks are capable of storing large amounts of data, though the performance of hard drives can vary substantially. The speed and size of your hard drive will be a major determining factor in how many tracks of audio you will be able to simultaneously record and playback.

Decibels

Audio signal levels are generally expressed in units called "decibels" which are abbreviated as "dB". This is a "logarithmic" scale where each doubling of signal level is represented by an increase of 6dB. Therefore a signal of 6dB is twice as big as a 0dB signal and a signal of 12dB is four times as big as a 0dB signal.

Since digital audio signals are represented by binary data, each bit of audio information represents 6dB. A 16-bit number can represent a total range of 96dB and a 24-bit number can represent a total range of 144dB (6 times the number of bits). It's much easier to say that one signal is 72dB less than another instead of saying it is 1/4096 the size of the other one. It also more accurately represents the way we hear sounds, since the smaller signal in the above example will still be audible and not appear to be only 1/4096 as loud when we listen to it.

Just as there are different types of degrees used to represent temperature (Fahrenheit, Celsius, etc), there are different types of decibels used to represent the level of analog audio signals. The most common are dBu and dBV decibels. Both of these represent voltage levels and still double for every increase of 6dB. It is only the reference point, or 0dB level that is different. A 0dBV signal has a voltage level of 1.0 volts. A 0dBu signal

has a voltage level of .775 volts. Since .775 is approximately 2dB less than 1.0, converting dBV levels into dBu levels is as simple as subtracting 2dB (2.21 to be exact).

Signals are also occasionally represented with units of dBm. This is an older unit that measures power instead of voltage levels with 0dBm representing 1 milliwatt. Earlier tube-based audio equipment used standardized input and output impedances of 600 ohms, so a 0dBm signal was produced with a voltage of .775 volts. Since most of today's equipment uses impedances other than 600 ohms, it is more useful to represent signals by voltages rather than power and the dBu unit was introduced. A signal level of 0dBu is identical to a level of 0dBm.

Digital signals, after they are recorded, no longer directly represent any physical quantity such as voltage or power and 0dB is generally used to represent a "full-scale" or maximum signal level. All other signal levels are lower and are expressed as negative decibels. Most meters on digital equipment have 0dB at the top and range downward from there. A signal that is 30dB below full scale would simply be referred to as a –30dB signal.

Nominal Signal Levels and Headroom

Today's equipment is generally referred to as +4dBu equipment (professional) or –10dBV equipment (consumer). These levels are the typical or "nominal" signal levels you can expect to see with professional (studio) equipment such as mixers or with consumer equipment such as home stereos and CD players. A +4dBu signal has a voltage level of 1.23 volts and a –10dBV signal has a voltage level of .316 volts.

The above nominal levels represent typical or average levels that are often exceeded when recording loud signals such as drum beats. The difference between the nominal level and the loudest signal that can be recorded without clipping is called "headroom". Your Echo hardware provides approximately 14dB of headroom allowing an 18dBu signal (9.8 volts or 28 volts peak to peak) to be recorded.

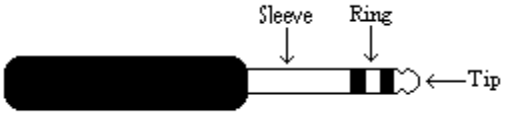
Unbalanced and Balanced Inputs and Outputs

An unbalanced signal, commonly used for guitars and consumer electronics, contains two components, a ground signal and a "hot" or active signal. The ground is the barrel of a ¼" connector and the shell of an "RCA" style connector.

A balanced signal contains two active signals instead of one in addition to the ground. These are referred to as the "plus" and "minus" signals. A balanced input amplifier amplifies the difference between these two signals. Any extraneous noise picked up from power lines or other sources will appear equally on both the plus and minus inputs. This is called "common mode" noise since it is common to both signals and the input amplifier will subtract the noise on the minus input from the noise on the plus input.

If the input amplifier is perfectly balanced and the noise on both plus and minus is precisely equal, the noise will completely cancel out. In the real world this is not the case and some of the common mode noise will still make it through, although at a much reduced level. How well an input amplifier rejects this common mode noise is called the "common mode rejection ratio" (abbreviated as CMRR) and is expressed in dB.

Balanced signals connect with either XLR connectors or TRS (tip, ring sleeve) connectors. Your Echo hardware uses TRS connectors for connecting balanced line level signals.



The three sections of a TRS connector are used to transmit the three components of a balanced signal (T = plus, R = minus, S = ground). Your Echo hardware can also accommodate the two conductor unbalanced style connector.

Dynamic Range

Dynamic range represents the difference between the maximum signal that can be recorded and the "noise floor", or level of noise with no signal present. A system with a high dynamic range will be quieter than one with a lower dynamic range. Dynamic range is a very important specification and Your Echo hardware uses converters that have very high dynamic range.

Theoretically, a 24-bit system has a dynamic range of 144dB and a 16-bit system has a dynamic range of 96dB. Two questions immediately come to mind:
Why does my Echo hardware only have a dynamic range of 106 dB?
For mastering 16-bit CDs with a dynamic range of 96dB, isn't anything more than 96dB just overkill?

First, today's analog to digital converters typically produce a full-scale input voltage with an input of +7dBu. If they were to have 144dB of dynamic range, they would have to be capable of resolving signals as small as –137dBu (7dBu – 144dBu) or approximately 10 nano-volts. That's 10 *one-billionths* of a volt! Transistors and resistors produce noise in this range just by having electrons moving around due to heat. Even if the converters could be perfectly designed to read these levels, the low noise requirements of the surrounding circuitry such as power supplies and amplifiers would be so stringent that they would either be impossible or too expensive to build.

In answering the second question, consider the fact that music is often compressed or amplified after it is recorded, and that some headroom is necessary when recording to avoid clipping. The only way that 96dB would be adequate is if all music were recorded so that the peaks were just under full-scale and no compressing or amplification was going to be applied after recording. Any time recorded music is amplified, so is the noise at the low end. Your Echo hardware has enough dynamic range to allow sufficient headroom and post-processing to be applied while still keeping the noise either off the CD completely or down as far as possible.

Appendix D: Specifications

Gina24 - Audio Performance

Analog Inputs (x2 balanced TRS):

- Frequency Response: 10Hz – 22kHz, ±0.25dB
- Dynamic Range: 108dB A-weighted
- THD+n: <0.001%, 20Hz–22kHz A-weighted
- Nominal Input Level: +4dBu
- Maximum Input Level: +18dBu
- Input Impedence: 10K

Analog Outputs (x8 balanced TRS):

- Frequency Response: 10Hz – 22kHz, ±0.25dB
- Dynamic Range: 110dB A-weighted
- THD+n: <0.002%, 20Hz–22kHz A-weighted
- Nominal Output Level: +4dBu
- Maximum Output Level: +18dBu

Gina24 - Hardware

- Host Interface: PCI bus mastering card
- Two balanced ¼” analog inputs with precision 24-bit 128x oversampling analog-to-digital converters
- Eight balanced ¼” analog outputs with high performance 24-bit 128x oversampling digital-to-analog converters
- S/PDIF digital I/O with up to 24-bit resolution
- ADAT optical digital I/O
- Headphone output with volume control
- On-board 24-bit Motorola DSP
- 24-bit data resolution maintained throughout entire signal path
- Multiple sample rates from 8kHz to 96kHz
- Esync clock I/O

Layla24 - Audio Performance

Analog Inputs (x8 balanced TRS):

- Frequency Response: 10Hz – 22kHz, ±0.25dB
- Dynamic Range: 110dB A-weighted
- THD+n: <0.001%, 20Hz–22kHz A-weighted
- Nominal Input Level: +4dBu
- Maximum Input Level: +22dBu
- Input Impedence: 10K

Analog Outputs (x8 balanced TRS):

- Frequency Response: 10Hz – 22kHz, ±0.25dB
- Dynamic Range: 115dB A-weighted
- THD+n: <0.002%, 20Hz–22kHz A-weighted
- Nominal Output Level: +4dBu
- Maximum Output Level: +22dBu

Layla24 - Hardware

- Host Interface: PCI bus mastering card
- Eight balanced ¼" analog inputs with precision 24-bit 128x oversampling analog-to-digital converters
- Eight balanced ¼" analog outputs with high performance 24-bit 128x oversampling digital-to-analog converters
- S/PDIF digital I/O with up to 24-bit resolution
- ADAT optical digital I/O
- Headphone output with volume control
- On-board 24-bit Motorola DSP
- 24-bit data resolution maintained throughout entire signal path
- Multiple sample rates from 8kHz to 96kHz
- MIDI In/Out/Thru
- Word clock I/O
- Esync clock Output

Mona -Audio Performance

Analog Inputs (x4):

- Frequency Response: 10Hz – 22kHz, ±0.25dB
- Dynamic Range: 110dB A-weighted
- THD+n: <0.001%, 20Hz–22kHz
- Nominal Input Level: +4dBu
- Maximum Input Level: +22dBu
- Microphone Input Level (balanced XLR):
    - EIN: -129dBV
    - Input Impedance: 1.5K
    - Gain Adjustment: 20 – 60dB
- Line Input Level (balanced TRS):
    - Input Impedance: 10K
    - Gain Adjustment: 0 – 40dB
- Guitar Input (unbalanced ¼”):
    - Input Impedance: 107K
    - Gain Adjustment: 10 – 50dB

Analog Outputs (x6):

- Frequency Response: 10Hz – 22kHz, ±0.25dB
- Dynamic Range: 115dB A-weighted
- THD+n: <0.002%, 20Hz–22kHz

- +4dBu Outputs (balanced XLR):
    - Nominal Output Level: +4dBu
    - Maximum Output Level: +22dBu

- -10dBV Outputs (RCA):

- Nominal Output Level: -10dBV
- Maximum Output Level: +8dBV

Mona - Hardware

- Host Interface: PCI bus mastering card
- Four high quality mic preamps with phantom power (+48v)
- Four universal analog inputs with precision 24-bit 128x oversampling analog-to-digital converters
- Six analog outputs (both XLR & RCA) with high performance 24-bit 128x oversampling digital-to-analog converters
- S/PDIF digital I/O with up to 24-bit resolution
- ADAT optical digital I/O
- Trim control and level meter for each analog input
- Headphone output with volume control
- On-board 24-bit Motorola DSP
- 24-bit data resolution maintained throughout entire signal path
- Multiple sample rates from 8kHz to 96kHz
- Word clock I/O
- Esync clock Output

Mia - Audio Performance

Analog Inputs (x2 balanced TRS):

- Frequency Response: 10Hz – 22kHz, ±0.5dB
- Dynamic Range: 106dB A-weighted
- THD+n: <0.001%, 20Hz–22kHz
- Nominal Input Level: +4dBu
- Maximum Input Level: +18dBu
- Input Impedence: 10K

Analog Outputs (x2 balanced TRS):

- Frequency Response: 10Hz – 22kHz, ±0.5dB
- Dynamic Range: 106dB A-weighted
- THD+n: <0.002%, 20Hz–22kHz
- Nominal Output Level: +4dBu
- Maximum Output Level: +18dBu

Mia - Hardware

- Host Interface: PCI bus card
- PCI bus master interface
- Two balanced ¼” analog inputs with precision 24-bit 64x oversampling analog-to-digital converters
- Two balanced ¼” analog outputs with high performance 24-bit 128x oversampling digital-to-analog converters
- S/PDIF digital I/O with up to 24-bit resolution
- On-board 24-bit Motorola DSP
- 24-bit data resolution maintained throughout entire signal path
- Multiple sample rates from 8kHz to 96kHz

A

ADAT 15, 25, 45, 54
analog resolution 58
analog-to-digital converter 57
ASIO 28
ASIO 2.0 ..... 47, 56
ASIO control panel 49
ASIO driver installation 28
ASIO software 56
ASIO tips 47
audio software 56

B

balanced 62
buffer size 49

C

cd-rom, contents 6
consumer mode 52
consumer output setting 53
contacting customer service 51
contents 6

D

decibels 60
digital data 60
digital recording 57
digital-to-analog converter 57
Direct Monitoring 47, 49, 56
dynamic range 63

E

Esync 45

G

G3 7
G4 7
G4 Cube 52
guitar input 20
guitar switch 20

H

hardware monitoring 47
headroom 61

I

iMac 52
input level meters 20
input trims 20
interface box, installing 14, 24
interface cable 6

L

latency 47, 49
line input 19

M

memory 8
microphone preamp 18
MIDI 17
MIDI time code 17
MTC 17
multiple Echo cards 56

N

nominal levels 61

O

optical 15, 25
OS X 52

P

PCI card, installation 11
PCI slot 8
phantom power 19

processor 8
processor upgrade card 8, 52
professional mode 52
professional output setting 53

R

rack-mount box, installing . 12, 13
recording, pops or skips 54

S

S/PDIF .. 15, 16, 25, 26, 27, 44, 54
S/PDIF cabling 16, 23, 26, 27
S/PDIF recording 52
S/PDIF resolution 58
sample rate 57, 59
sample size 58
SCMS copy-protection 53
selecting a slot 11
software monitoring 47
Sound Manager 52
specifications 64
static electricity, discharging 11
synchronization 44, 54
synchronizing multiple devices 44
system requirements 7

T

technical support 51
troubleshooting guide 52
TRS 27, 62

U

unbalanced 62
universal inputs 18

W

website 51
Word clock 16, 44